XipLink™
Better. Wireless.

ربط الشبكات السعودية
SAUDI NET LINK

Multi-Orbit SD-WAN Solution

XipLink :: Who We Are

XipLink develops the best-in-class **multi-orbit SD-WAN networking solution** with **secure link optimization** for **wireless networks** that dramatically **enhances user experience** while delivering a **rapid ROI** for our customers

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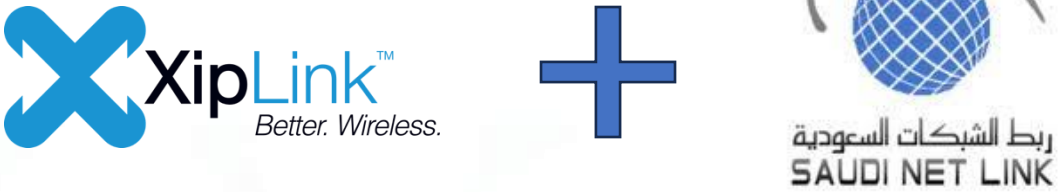
XipLink :: Saudi Netlink Partnership



Saudi Netlink and **XipLink** have been partners for **Over a Decade** addressing several vertical markets and key customers across Saudi Arabia like **STC**, **Aramco**, **MoD**, **MoI**

We jointly delivered resilient and secure multi-path solutions using Multi-Orbit Satellite and Terrestrial networks

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XipLink Overview :: Market Leadership

Highly Respected Client & User Base

iDirect, Kratos, AT&T, AsiaSat, Verizon, Telenor, FirstNet Built with AT&T, Hanwha, Saudi Net Link, ULTISAT, Telefonica, China Mobile, Intelsat, Spacebridge, NovelSat

Global Footprint

32+
Countries with XipLink Software Deployed

300+
Active Clients

Awards & Key Metrics

Deloitte Technology Fast 500

The Deloitte Technology Fast 500 is the leading technology awards program in North America. Combining technological innovation, entrepreneurship, and rapid growth. Fast 500 companies span a variety of industry sectors. These companies are on the cutting edge and are transforming the way we do business today.

Canada's Fastest-Growing Companies

The Growth List ranking of Canada's Fastest-Growing Companies are the most passionate, innovative and successful businesses in the country.

Most Promising SDN

CIO Review magazine chose XipLink as one of the 10 Most Promising SDN companies is 2020 to follow into the future.

TIP Community Labs

Community Labs are sponsored by Telecom Infra Project (TIP) members who provide a physical space for open innovation on TIP defined use cases. The TIP Community Labs is to accelerate the speed of innovation with a clear path to scalable deployment.

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Multi-Orbit SD-WAN

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XipLink :: Multi-Orbit SDWAN

Gigabit Class SD-WAN: Aggregation with Link Balancing, Bonding and Application Aware* Traffic Steering

Traffic Optimization: SCPS-TP Enhancements (Rate Control, Fast Start/Recovery), TCP-Acceleration, Packet Coalescing, Stream Duplication

Class based QoS, integrated with Intelligent Link Estimation and Application Aware classification

Basic Firewall: Application Aware* (Allow/Drop)

Security: IPsec VPN with X.509 Certificates and optional CMPv2 support. Offering encryption for WAN, LAN or split end-to-end via XipLink DOE.

Orchestration: Centralized Configuration, Rapid Install, Analytics, Reporting

Deployment Options: Software SD-WAN VNF, XipLink XH appliance

Aggregation with Traffic Steering

High Performance (Goodput)

Application Aware QoS and Firewall

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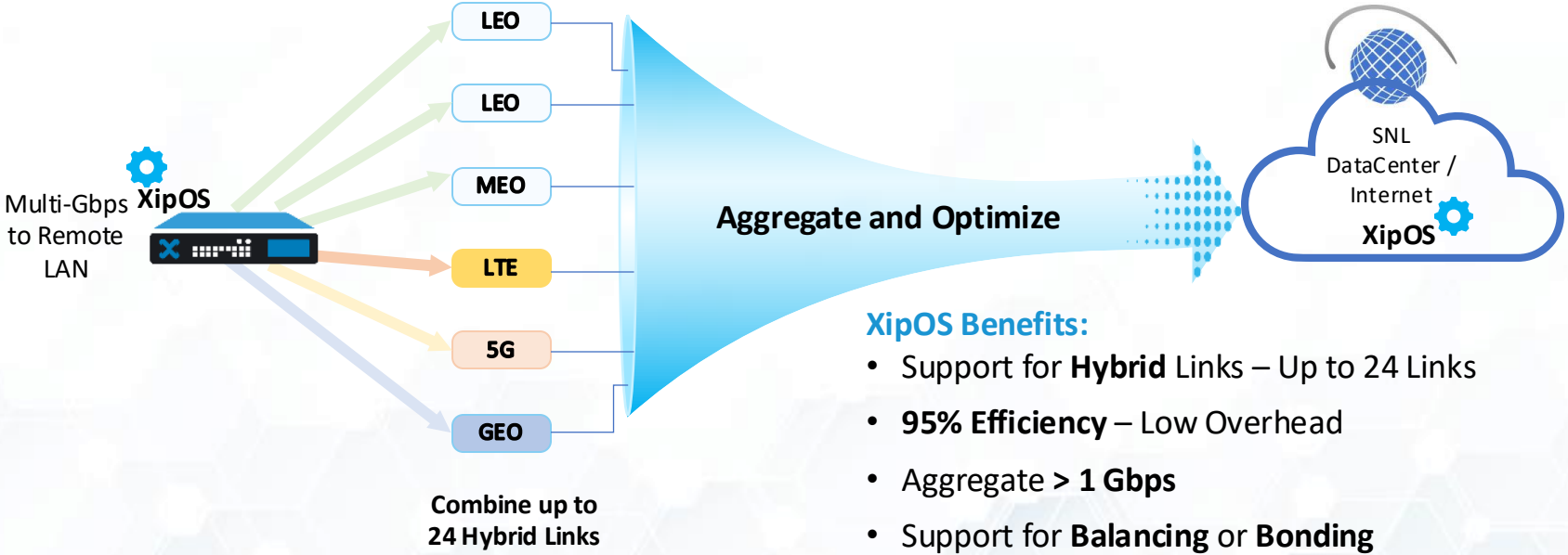
XipLink Features :: WAN Aggregation, Hybrid Links



XipOS Benefits:

- Support for **Hybrid** Links – Up to 24 Links
- **95% Efficiency** – Low Overhead
- Aggregate **> 1 Gbps**
- Support for **Balancing** or **Bonding**
- Automatic **Rebalancing** of Sessions
- **QoS per Link**

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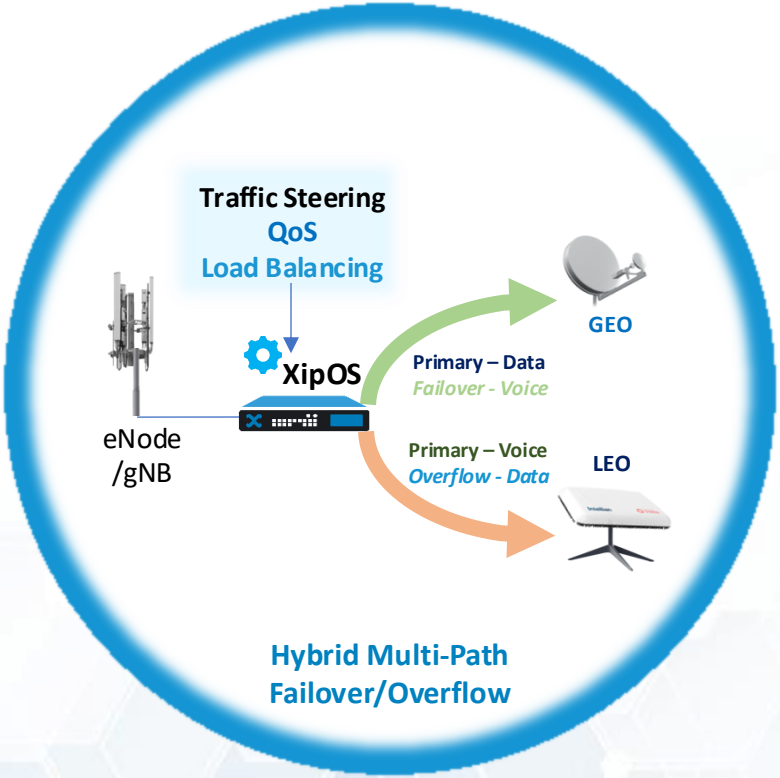
XipLink Features :: Traffic Steering w/ Bonding & Overflow



XipOS Benefit:

- Dynamically steer applications by QoS Class to most appropriate links
- Application **Priority** and **Resiliency**
- Uninterrupted Sessions
- Failover, Overflow

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XipLink Features :: Traffic Optimization

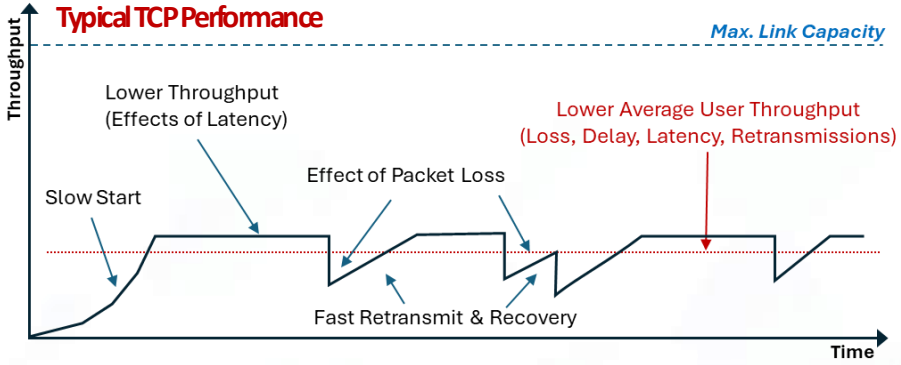
Optimized for **GEO, MEO, LEO, Cellular** and **Terrestrial**

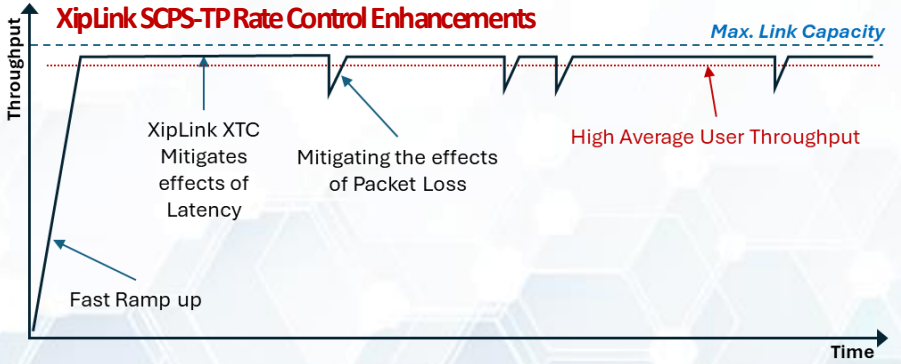
Standards-based SCPS-TP TCP Acceleration

30% + faster response times – **Better QoE**

2-3x faster file transfers

XipLink SCPS-TP value adds such as **Fast Start**, **AFR**, **SNACK**, **congestion controls** based on traffic patterns, **session persistence** and **rapid recovery** from congestion/failure





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XipOS :: Enhanced Buffer Management

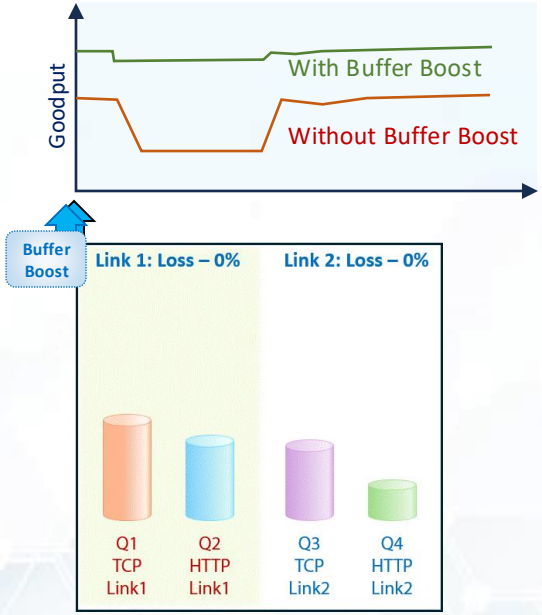
Dynamic Buffers: Buffers are dynamically resized based on demand, ensuring optimum use of compute resources. Eliminates bufferbloat.

Buffer Boost: Ensures sustained peak throughput by increasing allocated buffers as needed, ex. Lossy LEO services.

Improving **SLA delivery** over best-effort LEO services

SCPS-TP algorithms ensure **high application performance**

Tightly integrated with **Realtime Link Intelligence** and **Adaptive QoS**



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XipOS :: Realtime Link Intelligence

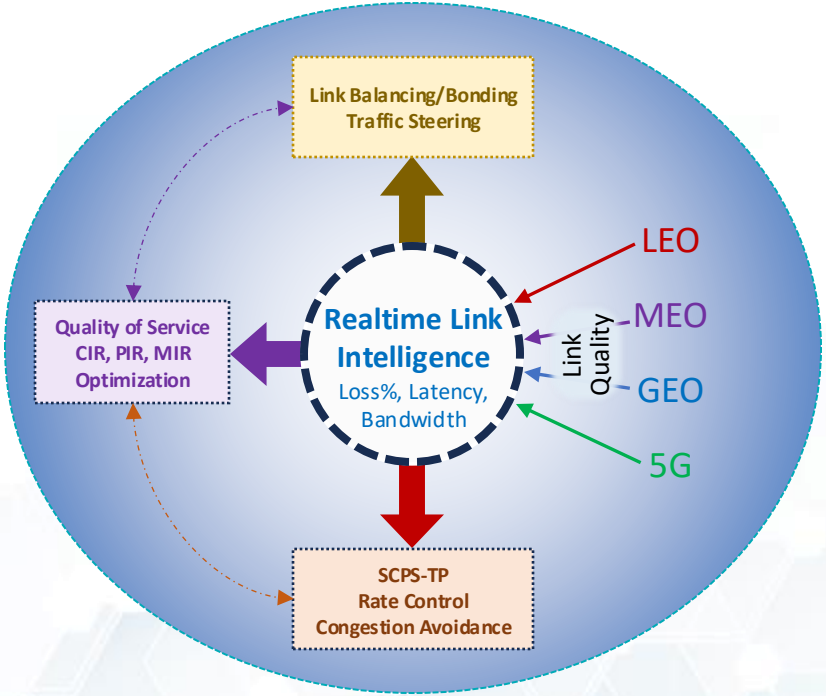
Realtime monitoring of each link for quality, bandwidth, link goodput, queuing delay (each direction), Loss%

Multiple **learning & predictive algorithms** that operate at different levels resulting in optimum performance

Coupled with **Rate Control**, **Congestion Avoidance** to ensure higher goodput & minimum re-transmissions

Feedback to **QoS Engine** enabling Adaptive QoS, no queue drops

Enables precise **Traffic Steering** and **Link Bonding**



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XipOS :: Stream Duplication

Selectively duplicate packets for selected streams across multiple links, critical for LEO

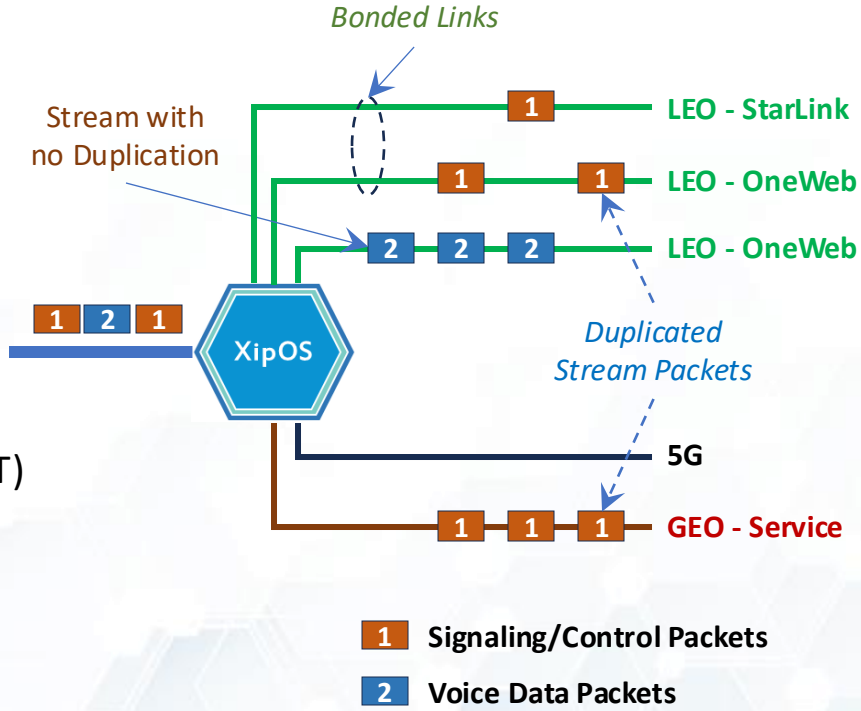
Support for **multiple backup links**

Increases **resiliency** and **availability** of critical applications for end users

Bonded links will be treated as a single link

Stream Duplication across **Hybrid Links** (different RTT)

Ideal for signaling, control plane or high value voice/video real-time applications



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XipOS :: Adaptive Quality of Service

Scalable **Hierarchical** classification/prioritization of traffic

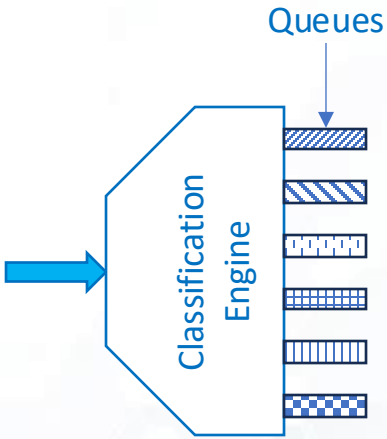
Tightly integrated with **Real-time Link Intelligence** (link quality)

Traffic Shaping – Guaranteed BW, Max BW, Shared BW

QoS **configuration per link**, with **separate queues**

Classify and prioritize data traffic in real-time (*overcome FAP issues of typical LEO services*)

Per Link **QoS queues** (Strict Priority, Class Based, Best Effort)



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XipACE :: DPI for advanced Traffic Steering

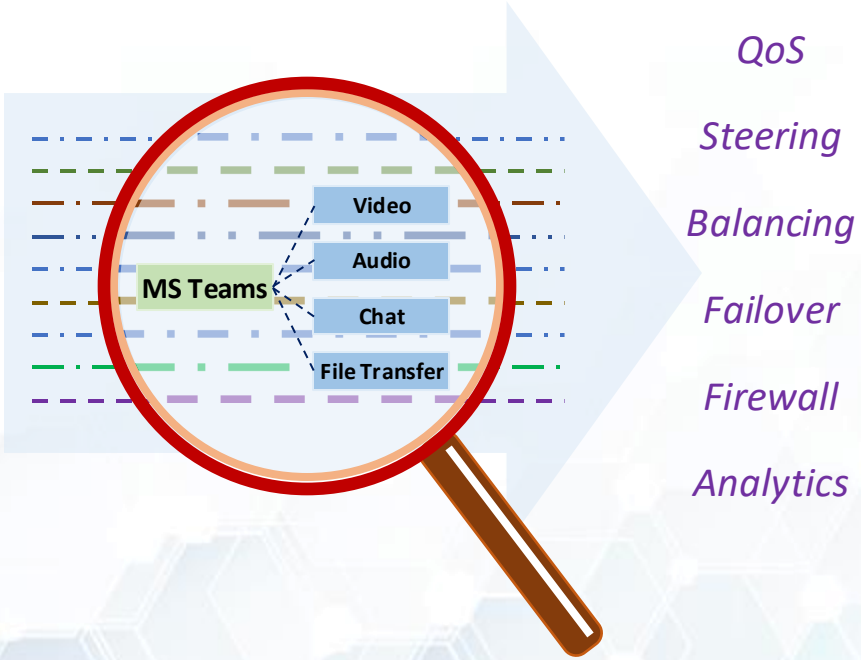
Deep Packet Inspection to identify and classify underlying traffic flows up to Layer 7 and beyond

Real-time IP network **traffic visibility** up to layer 7 and beyond

Application visibility to **analyze, manage and optimize**

Integrated with XipOS advanced QoS, for Link Balancing, Bonding and Traffic Steering

Application-aware routing enabling QoS and QoE Optimization



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XipLink XMS :: XipLink Management System

“XMS” is a comprehensive centralized management system

Configuration

Central Policy and Device Management
Central Licensing
Flexible Object based Templating

Analytics / Monitoring

Real-time metrics from XipOS & UX-Probe
User Defined Dashboard - Grafana

Multiple Management User Types

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XipLink Features :: Security

IPsec with CMPv2 (Encryption End-to-End)

AES-256 Bit

X.509 Certificates

Decrypt, Optimize, Encrypt (DOE)

Lightweight Tunnels

AAA (TACACS+/RADIUS Authentication)

** May require Export Control approval*

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XipOS - Deployment options

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XipLink Platform :: XipOS Deployment Options

XV - XipLink Virtual Software

XipOS SD-WAN deployed as a software virtual network function (XV). Hardware agnostic.

XA - XipLink Appliances

Turn-key XipLink appliances (XA) comprised of XipLink Hardware (XH) and XipLink Virtual SW image (XV) running XipOS.

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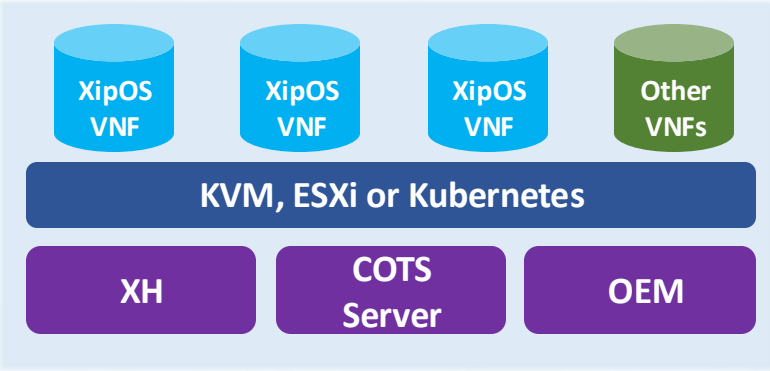
XipLink Platform :: XV Virtual Software

XipOS is available as a Virtual Machine

- Highly **Efficient**
- **Scalable** 4 Mbps to **multi-Gbps**
- Enables local HW maintenance
- Support KVM Hypervisor, Proxmox and ESXi
- Support Kubernetes with KubeVirt
- **Save** on shipping, import fees, customs
- **Rapid** delivery and deployment
- Enables **flexibility** in choosing HW platform
- Ex. Telco, Mil-Grade, Aero, SD-WAN, low cost



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XipLink Platform :: XH Virtualized Platforms (Rev6)

XH-1 (XA-1K, 2K, 4K)

- Up to 100 Mbps
- Up to 4K TCP sessions
- Fail-to-Wire support
- -48 VDC option
- Recommended XipOS Software:
  XV-1K to XV-4K

XH-10 (XA-6K, 10K, 20K)

- Up to 250 Mbps
- Up to 20K TCP sessions
- Fail-to-Wire support
- -48 VDC option
- Recommended XipOS Software:
  XV-6K to XV-20K

XipLink's XH computing platforms are built with industrial class, off-the-shelf systems and are designed to be easily installed in various network topologies

XH-100 (XA-30K, 60K, 100K)

- Up to 1 Gbps
- Up to 100K TCP sessions
- Fail-to-Wire support, SFP Interfaces
- Redundant Power (-48 VDC Option)
- Recommended XipOS Software:
  XV-30K to XV-100K

XH-1000 (XA-150K, 200K, 300K)

- Up to 3 Gbps
- Up to 300K TCP sessions
- Fail-to-Wire support, SFP Interfaces
- Redundant Power (-48 VDC Option)
- Recommended XipOS Software:
  XV-150K, 2 x XV-100K, 3 x XV-100K

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Use Cases

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Use Case :: Capacity Increase with Balancing and Bonding

Link Balancing and Bonding up to 24 Hybrid Links

Up to 3 Gbps and 300,000 Sessions aggregate throughput per remote (Edge device dependent)

Dynamic Bandwidth Estimation and QoS seamlessly manage traffic across each link, maintain QoS

Session Persistence across all link types

Seamless Redundancy automatic session failover to available links

Secure Links with AES 256-bit encryption option

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Use Case :: Cellular Backhaul WAN Diversity

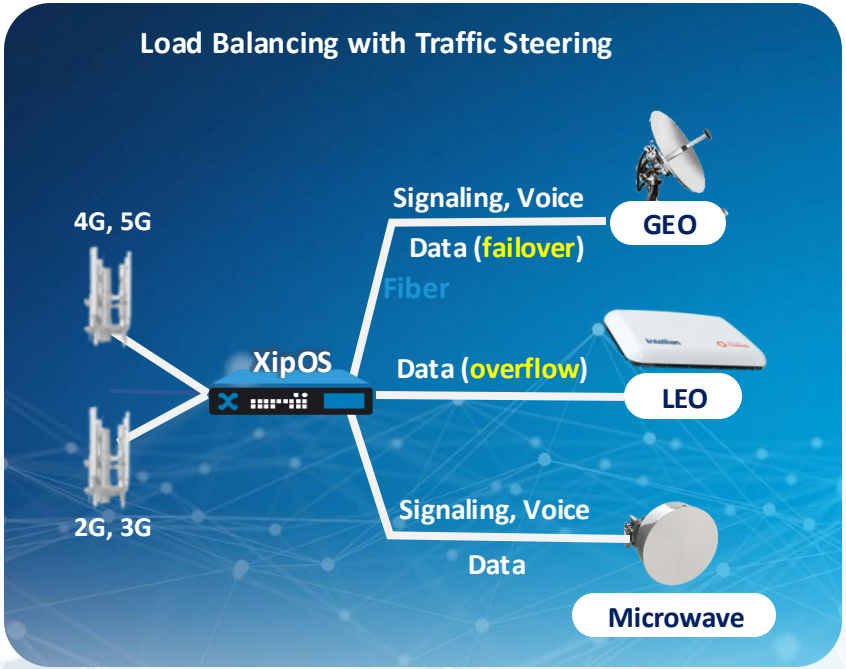
Link Balancing with intelligent traffic steering across multiple links

Cost Optimization with traffic steering using lower cost WAN services for data

QoS per Link to maintain highest performance and SLAs across services

Seamless Redundancy automatic session failover to available links

Improved Availability with multiple links and XipOS load balancing with traffic steering



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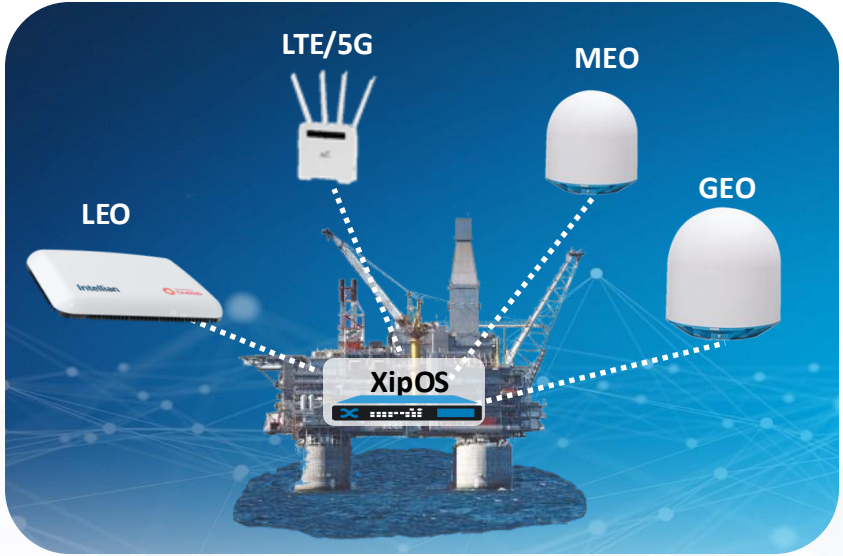
Use Case :: Link Balancing with Traffic Steering, Failover

Link Balancing with intelligent traffic steering across multiple links

QoS per Link to maintain highest performance and SLAs across services

Seamless Redundancy automatic session failover to available links

Improved Availability with multiple links and XipOS load balancing with traffic steering



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Use Case :: Redundancy, and Link Bonding

Blockage Mitigation continuous connectivity even when one antenna is blocked

Redundancy supporting seamless failover of traffic if a link fails

Link Balancing / Bonding up to 24 links (Hybrid links supported)

Advanced QoS ensure critical applications get highest priority

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Multi-Path/Multi-Orbit Live Demonstration LEO/GEO/Cellular Aggregation and Resiliency

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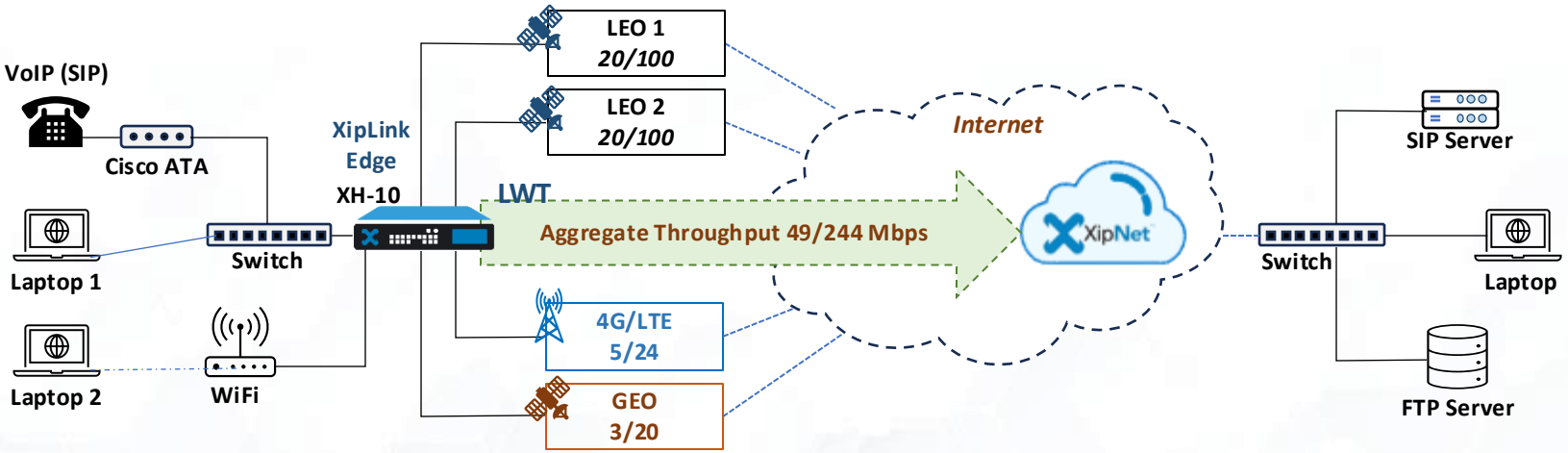
Customer 1 Test :: Connectivity Diagram



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Customer 1 :: **Links and Steering** Policies by Application

Link1	Link2	Link3	Link4
Eutelsat GEO Service	OneWeb LEO-1	OneWeb LEO-2	LTE Service

Application	Default Link	Failover 1	Failover 2	Failover 3
VoIP (SIP)	GEO	4G/LTE	Balance over LEO Links	
Teams Video/ Call	LEO 1	LEO 2	4G/LTE	GEO
File Transfer	GEO	Balance across all available links		
Youtube	Stream balance across all available links			
Web browsing (and other applications)	Stream balance across all available links			

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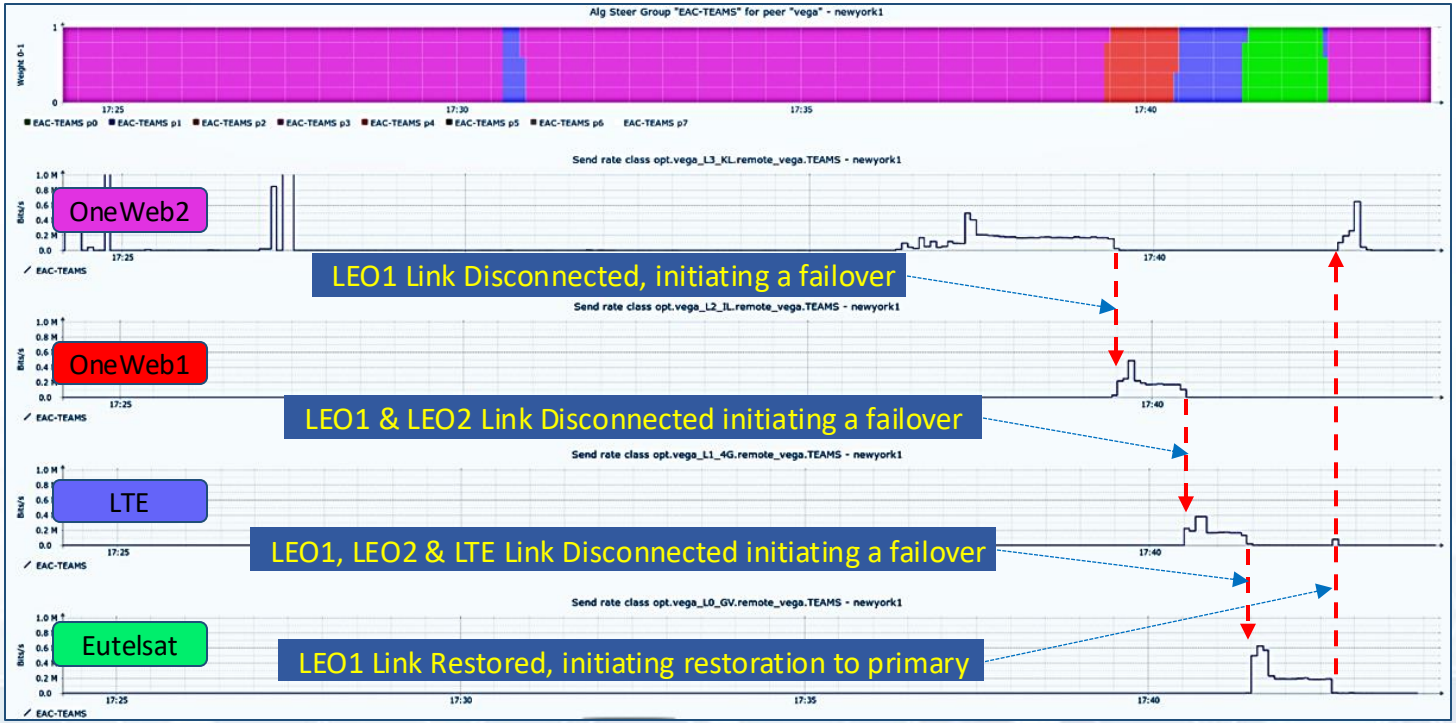
Test 1 :: Teams Video Call

Teams video call *was established over the Preferred Link LEO1, then automatically moved to LEO2 to 4G to GEO VSAT, by disconnecting the related links.*

System delivered ***uninterrupted video call*** *successfully through failover to each link.*
No visible degradation *when* ***automatically*** *switching between links.*



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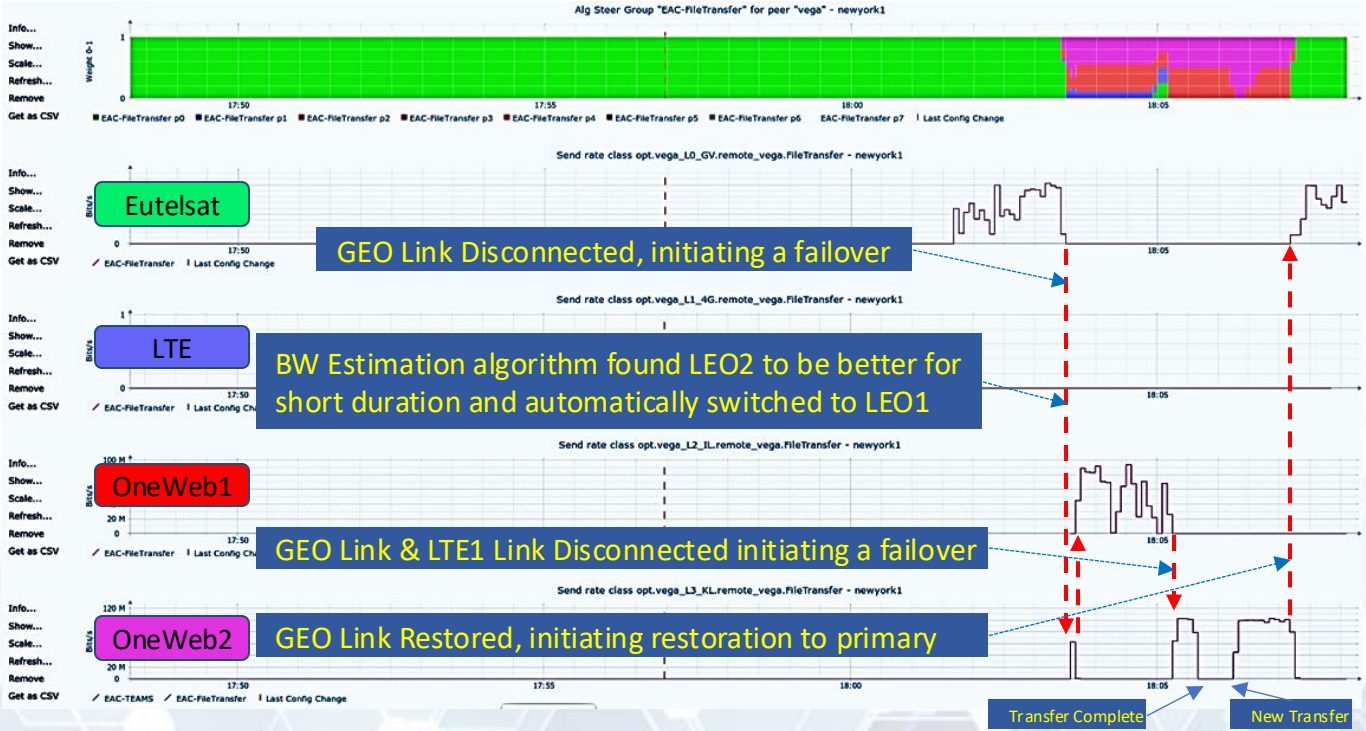
Test 2 :: File Transfer

*A **1GB file transfer** was initiated and **automatically moved** between links when a service was disconnected.*

***Uninterrupted data transfer** continued while ramping up to the max throughput on **GEO (24 Mbps)**, **4G/LTE (24 Mbps)**, **LEO1 (100 Mbps)** and **LEO2 (100 Mbps)**.*


Alg Steer Group "EAC-FileTransfer" for peer "vega" - newyork1
Send rate class opt.vega_L0_GV.remote_vega.FileTransfer - newyork1
Eutelsat
GEO Link Disconnected, initiating a failover
Send rate class opt.vega_L1_4G.remote_vega.FileTransfer - newyork1
LTE
BW Estimation algorithm found LEO2 to be better for short duration and automatically switched to LEO1
Send rate class opt.vega_L2_IL.remote_vega.FileTransfer - newyork1
OneWeb1
GEO Link & LTE1 Link Disconnected initiating a failover
Send rate class opt.vega_L3_KL.remote_vega.FileTransfer - newyork1
OneWeb2
GEO Link Restored, initiating restoration to primary
Transfer Complete
New Transfer

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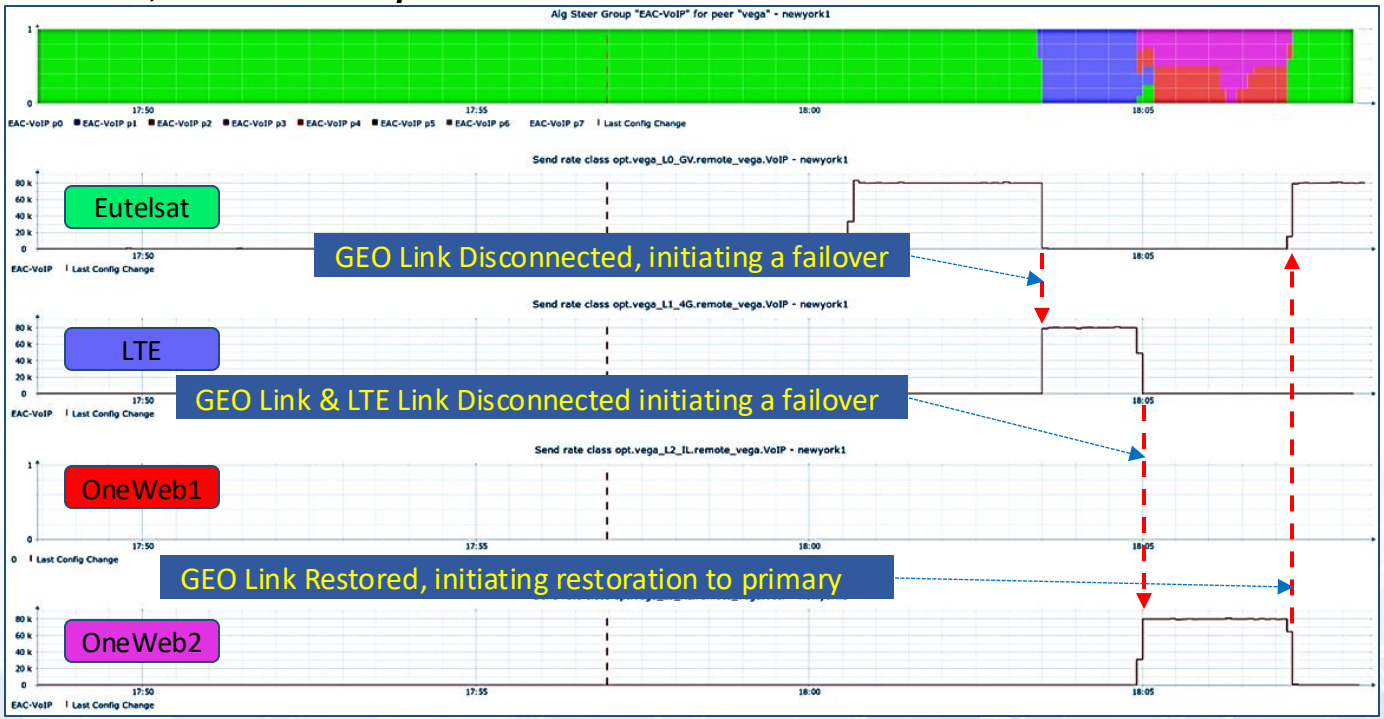
Test 3 :: Voice Call (w/music in background)

*A **SIP voice call** from St. Petersburg to an administrator HQ phone in Northern Virginia with music was playing in the background to ensure continuity (no quiet time).*

*Specific links were disconnected to **automatically move traffic** to the next priority link, from GEO to 4G to LEO and back, with **no interruptions**.*



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Customer 2 :: Links and Steering Policies by Application

Link1	Link2	Link3	Link4
Inmarsat GEO Service	Intelsat GEO Service	OneWeb LEO	StarLink LEO

Application	Default Link	Failover 1	Failover 2
VoIP (SIP)	OneWeb	StarLink	Inmarsat
File Transfer	Inmarsat	Balance across OneWeb and StarLink	
Traffic Balancing	Stream Balance across OneWeb and StarLink		
Traffic Bonding	Bond traffic across LEO Links		

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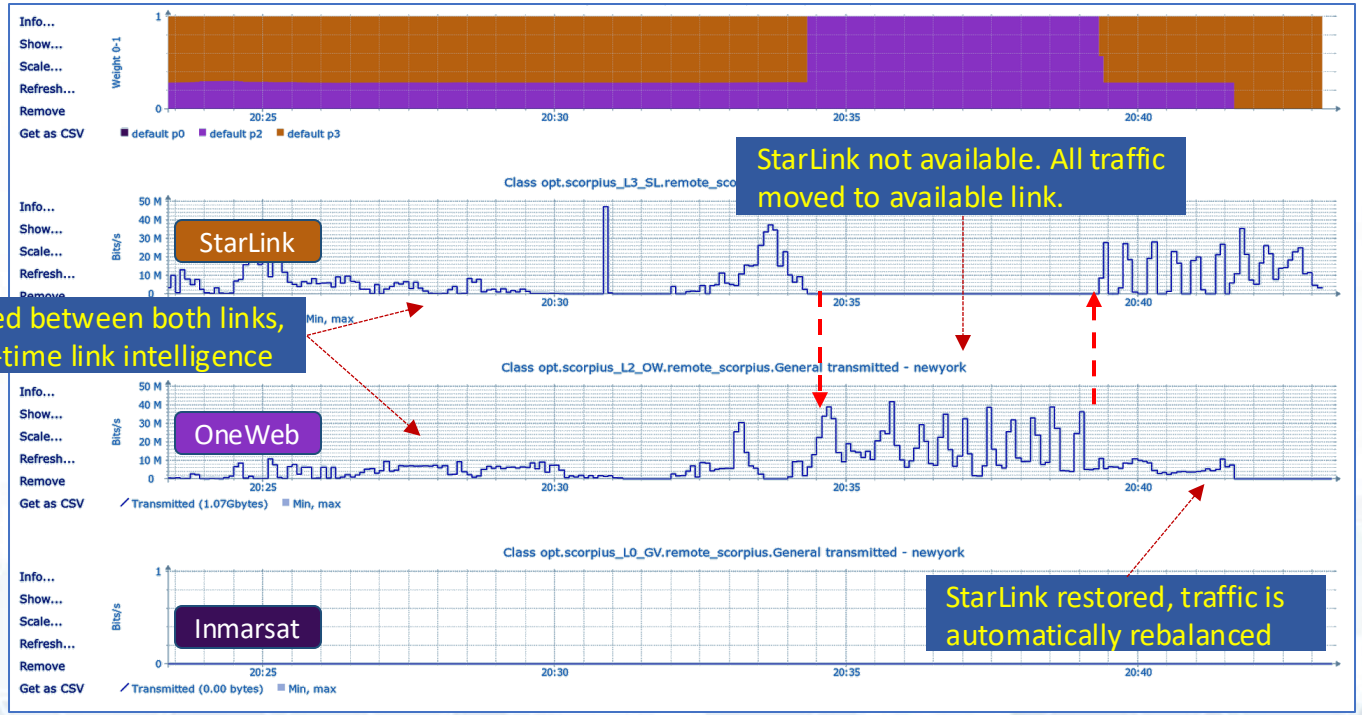
Traffic Balancing :: Increased Capacity

- All traffic automatically balanced across available links
- If any of the link fails traffic is **automatically** moved to the available link, with **NO** interruption
- Traffic is **rebalanced automatically** based on feedback from **real-time Link Intelligence**



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Bonding :: Higher Capacity

- **Bonding** capacity from both links to give a higher capacity to a **single application** or **traffic stream**
- Traffic **accelerated** and QoS applied for each link

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Key Features & Summary

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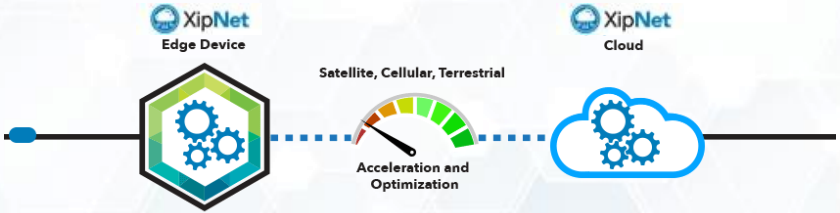
XipLink :: Key Technologies Summary

Link Balancing and Bonding

Maximize Traffic Flow

Accelerate and Optimize



Intelligent Application Traffic Steering

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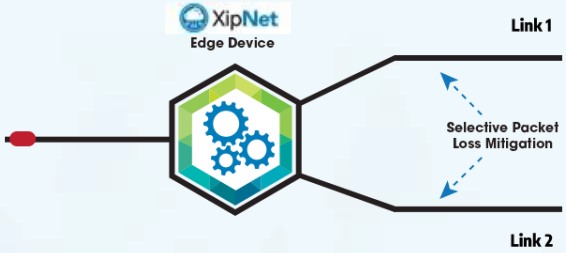
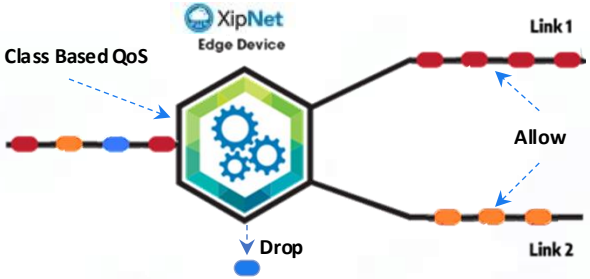
XipLink :: Key Technologies Summary

Intelligent Stream Traffic Spreading



Application Aware QoS & Firewall



Service Redundancy

Service Overflow

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XipLink :: *XipOS Feature Suite*

XipOS has numerous features and functions that work together to provide the best **User Experience**, **Capacity**, **Performance**, **Service Resiliency** and **Always-on** services

- *Acceleration*
- *Optimization*
- *Traffic Management*
- *Security*
- *Networking*
- *Management*

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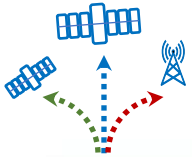
XipLink SD-WAN :: XipLink Differentiators

Traffic Aggregation, Routing, & Steering:

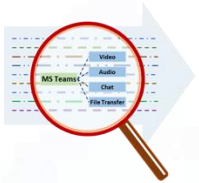
- Balancing/bonding, routing and steering deliver true SD-WAN hybrid network flexibility
- Scaling via aggregation to gigabit+ speeds over 24 links, with failover and priority/overflow
- Selective stream duplication – guaranteed delivery for mission critical traffic over two or more links



Aggregation & Traffic Steering

Reliable Services Over Best Effort Links:

- Real-time Link Intelligence – tracks and matches available link capacity in near real-time
- Advanced, highly configurable QoS engine overlays and synchronizes with link intelligence link



App. Aware QoS & Link Estimation

Satellite & Wireless Application Performance:

- Enhanced user experience via TCP acceleration and traffic management over constrained wireless links
- XipLink has approximately 20 years of experience optimizing satellite and wireless links
- Integrated solution for link estimation, QoS/SLA management and acceleration/optimization

High Performance (Goodput)

Lowered Total Cost of Ownership (TCO):

- Delivers better utilization (lower $/bit)
- Reduced box count (combined router, QoS, acceleration, firewall and optional encryption)

TCO

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THANK YOU!

XipLink Better. Wireless.

ربط الشبكات السعودية
SAUDI NET LINK

A 4200 St. Laurent Blvd, Suite 1010, Montreal, QC H2W 2R2

P +1 (514) 848 - 9640

E info@xiplink.com

W www.xiplink.com